# Ceiling Mount Temperature Sensor

General

Ceiling Mount Temperature Sensor Model TY7301 is a temperature sensor designed to be used with electronic controllers.

This sensor is suitable for detecting temperature in a column free space/room, a stylish space/room, and other spaces where installation location of a temperature sensor is restricted in a building.
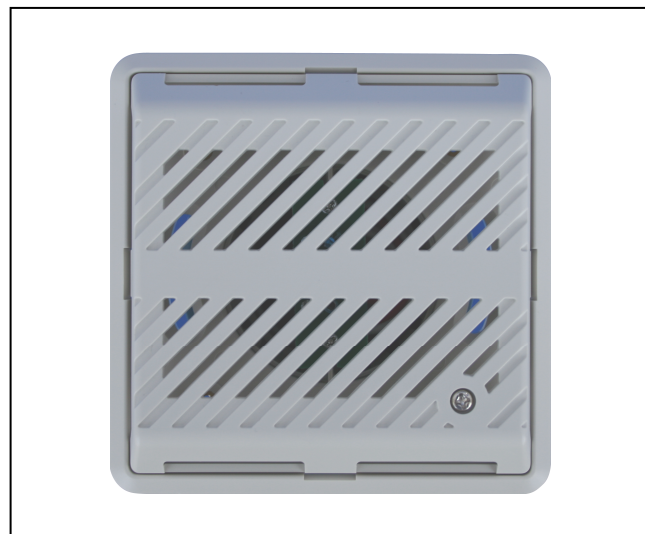
Features

- Minimizes impact on interior design and maximizes interior space.

- Fits well on a ceiling with the thin, square, and simple body.

- Mountable on various types of ceilings such as steel ceiling panel and acoustic ceiling board.

- Ensures flexibility of interior layout compared to wall-mount type temperature sensor.

- Available to mount and perform maintenance in an interior space.

Model Numbers

Model number	Description		
TY7301B2000	Ceiling mount temperature sensor:	- RTD (Pt100) - Lead wire connection - Screw-mount cover	
TY7301B2001	Ceiling mount temperature sensor:	- RTD (Pt100) - Modular cable connection - Screw-mount cover	
TY7301K2000	Ceiling mount temperature sensor:	- RTD (Pt1000) - Lead wire connection - Screw-mount cover	

RTD: Resistance temperature detector

Options

Item		Model number/Part number	Note
Mounting bracket*	Ceiling sensor mounting bracket for a steel ceiling panel	Part No. 83153520-001	Not mountable on an acoustic ceiling board.
	Recommended mounting clamp for an acoustic ceiling board (manufactured by Negurosu Denko Co., Ltd.)	Model HKC1 (not supplied by Azbil Corporation)	Mountable on the 12 to 19 mm thick acoustic ceiling board.
LAN cable for the modular connection model		Part No. DY7210	Use LAN cable that meets the following: - LAN cable compliant with EIA/TIA-568 Category 3 or over (⌀0.5 mm x 4 pairs). - Connectable wiring length must be in accord with the wiring specifications of a controller in connection.

Note:
 * Arrange a mounting bracket appropriate for the ceiling (thickness, material, etc.) to install.
   Ask your sales/service person for details.

AB-5272

Safety Instructions

Please read instructions carefully and use the product as specified in this manual. Be sure to keep this manual near by for ready reference.

Usage Restrictions

This product is targeted for general air conditioning. Do not use this product in a situation where human life may be affected. If this product is used in a clean room or a place where reliability or control accuracy is particularly required, please contact our sales representative. Azbil Corporation will not bear any responsibility for the results produced by the operators.

Warnings and Cautions

⚠ WARNING	Alerts users that improper handling may cause death or serious injury.
⚠ CAUTION	Alerts users that improper handling may cause minor injury or material loss.

Signs

⚡	Alerts users possible hazardous conditions caused by erroneous operation or erroneous use. The symbol inside △ indicates the specific type of danger. (For example, the sign on the left warns of the risk of electric shock.)
🚫	Notifies users that specific actions are prohibited to prevent possible danger. The symbol inside ◌ graphically indicates the prohibited action. (For example, the sign on the left notifies that disassembly is prohibited.)
❗	Instructs users to carry out a specific obligatory action to prevent possible danger. The symbol inside ● graphically indicates the actual action to be carried out. (For example, the sign on the left indicates general instructions.)

⚠ CAUTION	
❗	Install the product in a location that satisfies the operating conditions (temperature, humidity, power, vibration, shock, mounting direction, atmospheric condition, etc.) as listed in the specifications and use the product within the operating ranges as listed in the specifications. Failure to do so might cause fire or device failure.
❗	Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards.
❗	All wiring must comply with applicable codes and ordinances.
🚫	Do not disassemble the product. Doing so might cause device failure.
❗	Dispose of the product as industrial waste in accordance with your local regulations. Do not reuse all or part of this product.

Specifications

Item		Specification	
Measuring range		0 °C to 60 °C	
Measuring accuracy	RTD (Pt100)	± 0.3 °C * 1 mA applied current, 0.5 m/s air velocity for Models TY7301B2000, TY7301B2001	
	RTD (Pt1000)	± 0.5 °C * 0.1–0.3 mA applied current, 0.5 m/s air velocity for Models TY7301K2000	
Output signal		100 Ω / 0 °C (RTD (Pt100) conforming to JIS C 1604 Class A) for Models TY7301B2000, TY7301B2001	
		1000 Ω / 0 °C (RTD (Pt1000) equivalent to JIS C 1604 Class A) for Models TY7301K2000	
Time constant		Within 3 min. (at 0.5 m/s ambient air velocity)	
Environmental conditions		Operating conditions	Transport/storage conditions
	Ambient temperature	0 °C to 60 °C	-10 °C to + 65 °C
	Ambient humidity	10 %RH to 90 %RH (Non-condensing)	5 %RH to 95 %RH (Non-condensing)
Insulation resistance		Min. 500 V DC, 100 MΩ	
Withstand voltage		500 V AC applied for 1 min. with maximum of 5 mA leakage current	
		600 V AC applied for 1 sec. with maximum of 5 mA leakage current.	
Color		Light gray	
Material		Flame retardant ABS	
Weight		Approx. 70 g	
Wiring	Lead wire connection	Three wires (one red wire and two white wires) with heat-resistant vinyl jacket, 0.75 mm^2, 300 mm long for Model TY7301B2000	
		Two wires (one red wire and one white wire) with heat-resistant vinyl jacket, 0.75 mm^2, 300 mm long for Model TY7301K2000	
	Modular connection	Modular cable, 160 mm long for Model TY7301B2001	
Accessory		Two M4 x 12 screws and two M4 x 35 screws for mounting	

ABS: Acrylonitrile butadiene styrene
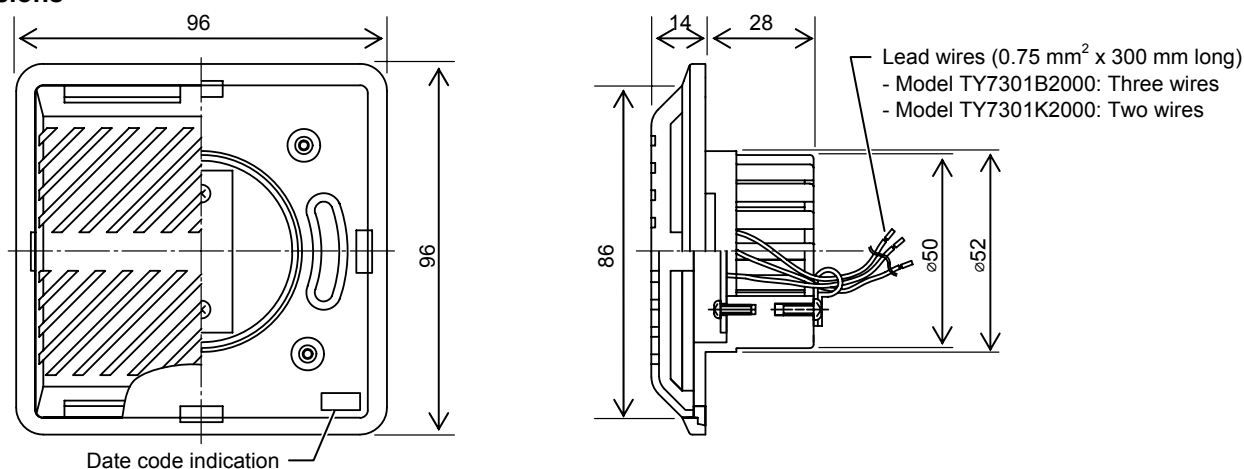JIS: Japanese Industrial Standards

Dimensions

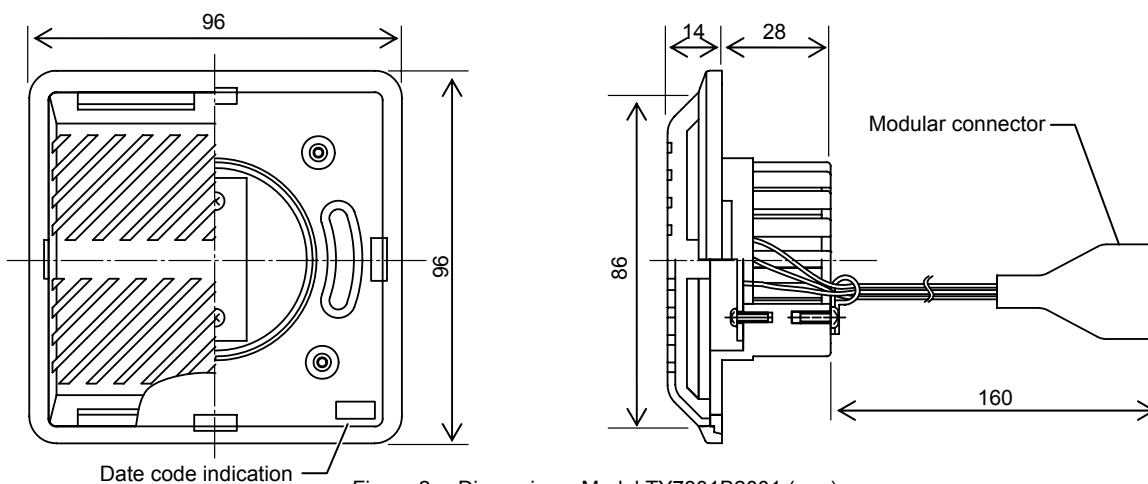Figure 1.   Dimensions: Models TY7301B2000, TY7301K2000 (mm)

Figure 2.   Dimensions: Model TY7301B2001 (mm)

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Installation

⚠ CAUTION
❗ Install the product in a location that satisfies the operating conditions (temperature, humidity, power, vibration, shock, mounting direction, atmospheric condition, etc.) as listed in the specifications and use the product within the operating ranges as listed in the specifications. Failure to do so might cause fire or device failure.
❗ Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards.

Installation location

Follow the below instructions when installing the ceiling mount temperature sensor.

- Install the ceiling mount temperature sensor on a ceiling.
  Note: This product is designed to install on a ceiling.   Do not install on a wall.

- Check that the air conditioning system has return air chamber in the ceiling.

- To install the ceiling mount temperature sensor in an interior zone of a room;
  - Check that the room atmosphere passes through the sensing element inside this product.
  - Prevent short-circuit of this product.
  - Keep away from heat generated by lights and other devices.

- To install the ceiling mount temperature sensor in a perimeter zone of a room;
  - Check that the room atmosphere passes through the sensing element inside this product.
  - Prevent short-circuit of this product.
  - Keep away from supply air outlet on a ceiling.
  - Keep away from supply air outlet on a ceiling along with windows, and install on a inner side of the ceiling.
  - Keep away from the radiation heat of the sun.

Things to do before installation

- Arrange a mounting bracket suitable for the ceiling (thickness, material, etc.) to install.
  The ceiling mount temperature sensor is installed using a mounting bracket.   See **Options** section for details.

- Open a mounting hole on the ceiling.   The size of the mounting hole must be appropriate for your mounting bracket.
  To install the ceiling mount temperature sensor using the specified mounting bracket for a steel ceiling panel or the recommended mounting clamp for an acoustic ceiling board, open ⌀82 ±1 mm hole as shown in the figure below.
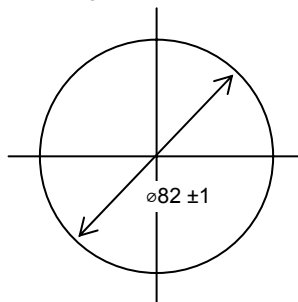

⌀82 ±1

Figure 3.   Mounting hole diameter (mm)

- Refer to the following installation examples for installation.   Note that the installation steps may differ depending on the thickness and material of ceiling as well as the type of your mounting bracket.

Installation example on acoustic ceiling board

The following shows the steps to install the ceiling mount temperature sensor with the recommended mounting clamp for an acoustic ceiling board.

1) Remove the cover from the main unit of the ceiling mount temperature sensor.

2) Temporarily attach the mounting clamp to the main unit by tightening the two cross-recessed flat-head screws (M4 x 35, supplied with the product).
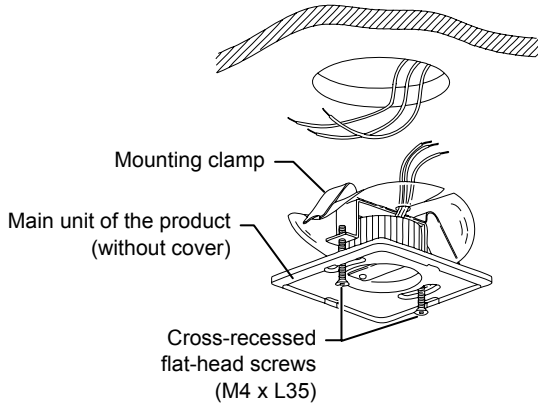
Mounting clamp

Main unit of the product (without cover)

Cross-recessed flat-head screws (M4 x L35)

Figure 4. Installation on acoustic ceiling board: Step 2 for Models TY7301B2000 and TY7301K2000 (Lead wire connection)

Mounting clamp

Main unit of the product (without cover)
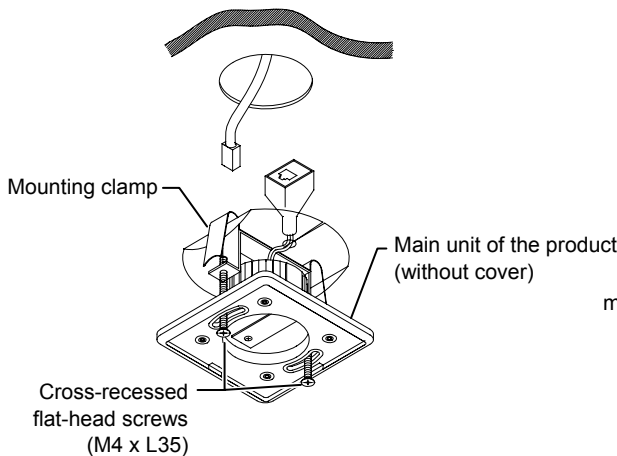
Cross-recessed flat-head screws (M4 x L35)

Figure 5. Installation on acoustic ceiling board: Step 2 for Model TY7301B2001 (Modular connection)

3) Wire the ceiling mount temperature sensor.

Models TY7301B2000 and TY7301K2000: Splice the wires for sensor connection (that run in the ceiling) to the wires of the ceiling mount temperature sensor.

IMPORTANT:
Splice the wires and attach wire end caps for perfect connection of Model TY7301B2000/TY73001K2000.

Model TY7301B2001: Plug the modular cable for sensor connection (that runs in the ceiling) into the modular connector of the ceiling mount temperature sensor.

IMPORTANT:
Plug in the modular cable into the modular connector until they click and lightly pull the modular cable to make sure perfect connection of Model TY7301B2001.

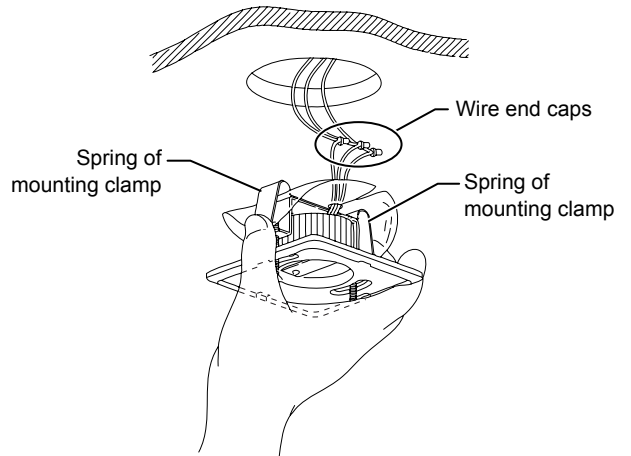4) Press and hold the springs of the mounting clamp and attach to the ceiling.

Wire end caps

Spring of mounting clamp

Spring of mounting clamp

Figure 6. Installation on acoustic ceiling board: Step 4 for Models TY7301B2000 and TY7301K2000 (Lead wire connection)

Spring of mounting clamp

Spring of mounting clamp

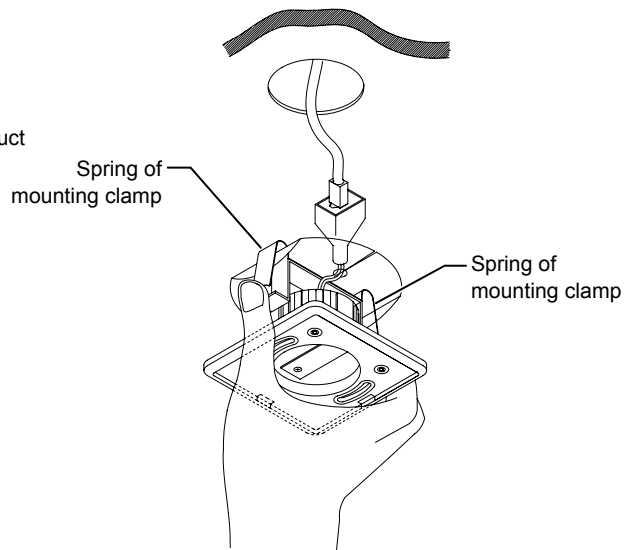Figure 7. Installation on acoustic ceiling board: Step 4 for Model TY7301B2001 (Modular connection)

5) Make sure that installation position is correct and completely tighten the screws to fix the main unit and mounting clamp on the ceiling.

IMPORTANT:
Carefully tighten the screws using a tool so as not to damage the sensing element of the main unit.

6) Attach the cover to the main unit until the cover clicks. Then, lightly pull the cover to make sure that the cover is completely attached.
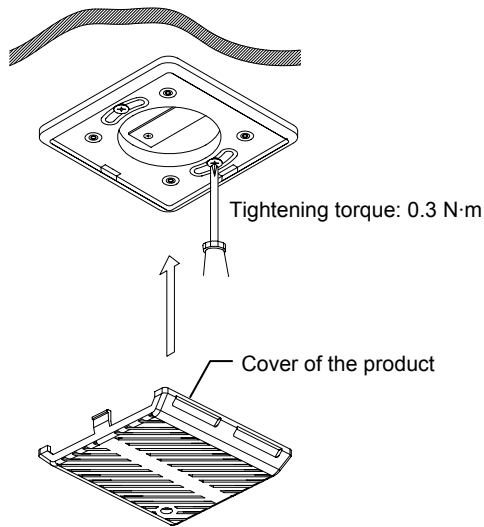
Tightening torque: 0.3 N·m

Cover of the product

Figure 8. Installation on acoustic ceiling board: Steps 5 and 6

7) Fix the cover to the main unit with the screw (provided on the cover).

Note:
Four screw holes are provided on each corner of the main unit. The cover is thus attachable in any of the four orientations.
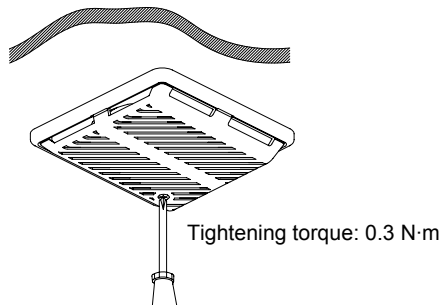
Tightening torque: 0.3 N·m

Figure 9. Installation on acoustic ceiling board: Step 7

Installation example on steel ceiling panel

The following shows the steps to install the ceiling mount temperature sensor with our optional mounting bracket for a steel ceiling panel.

1) Remove the cover from the main unit of the ceiling mount temperature sensor.

2) Put the mounting bracket on the inside surface of the steel ceiling panel. At this time, make sure that the side with the rubber magnet of the mounting bracket faces the inside surface of the steel ceiling panel.

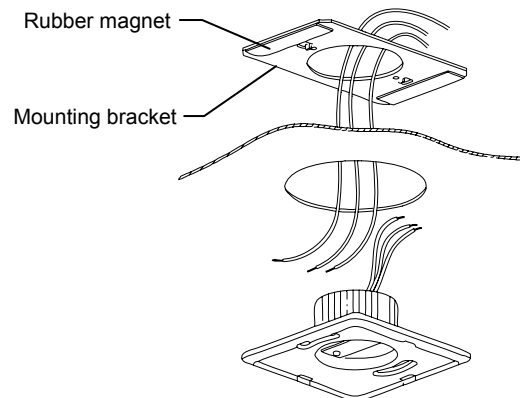3) Center the ⌀56 mm hole of the mounting bracket on the hole of the steel ceiling panel.

Rubber magnet

Mounting bracket

Figure 10. Installation on steel ceiling panel: Steps 2 and 3 for Models TY7301B2000 and TY7301K2000 (Lead wire connection)
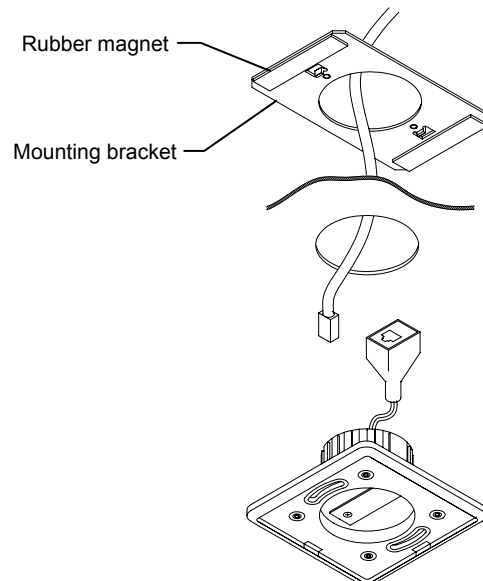
Rubber magnet

Mounting bracket

Figure 11. Installation on steel ceiling panel: Steps 2 and 3 for Model TY7301B2001 (Modular connection)

4) Wire the ceiling mount temperature sensor.

Models TY7301B2000 and TY7301K2000: Splice the wires for sensor connection (that run in the ceiling) to the wires of the ceiling mount temperature sensor.

IMPORTANT:
Splice the wires and attach wire end caps for perfect connection of Model TY7301B2000/ TY7301K2000.

Model TY7301B2001: Plug the modular cable for sensor connection (that runs in the ceiling) into the modular connector of this product.

IMPORTANT:

Plug the modular cable into the modular connector until they click and lightly pull the modular cable to make sure perfect connection of Model TY7301B2001.

5) Make sure that installation position is correct and completely tighten the two cross-recessed flat-head screws
(M4 x 12, supplied with the product) to fix the main unit and mounting bracket.

IMPORTANT:

Carefully tighten the screws using a tool so as not to damage the sensing element of the main unit.

6) Attach the cover to the main unit until the cover clicks. Then, lightly pull the cover to make sure that the cover is completely attached on the ceiling.
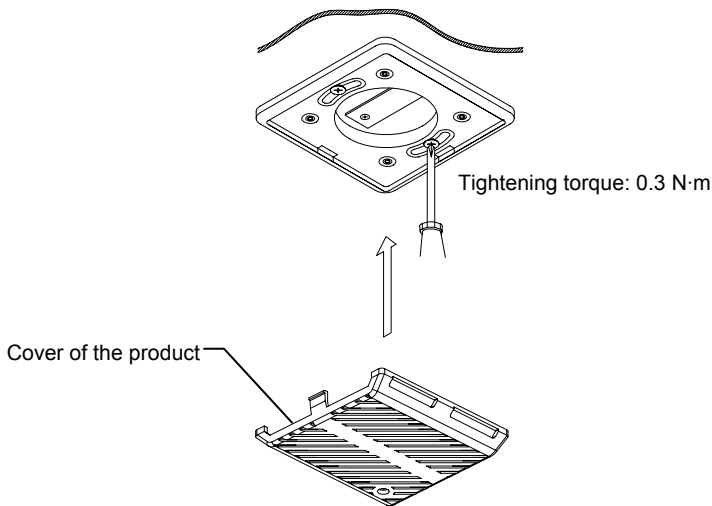
Tightening torque: 0.3 N·m

Cover of the product

Figure 12.   Installation on steel ceiling panel: Steps 5 and 6

7) Fix the cover to the main unit with the screw (provided on the cover).
   Note:
   Four screw holes are provided on each corner of the main unit.   The cover is thus attachable in any of the four orientations.
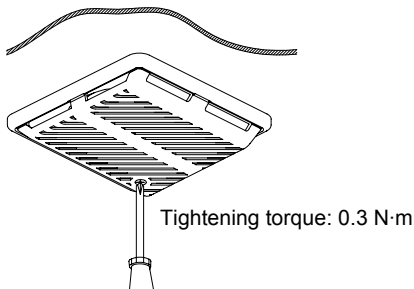
Tightening torque: 0.3 N·m

Figure 13.   Installation on steel ceiling panel: Step 7

Wiring

⚠ CAUTION

Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards.

All wiring must comply with applicable codes and ordinances.

IMPORTANT:

For wiring installation, separate the power supply lines of other devices from the signal line of the ceiling mount temperature sensor.

Precautions for wiring

Because the ceiling mount temperature sensor with RTD (Pt1000) output is two-wire, the wire resistance will cause measuring error.   For instance, 1.25 mm^2 size wire causes approx. 0.1 °C measuring error every 10 m.   Correct the measuring error by setting the controller in connection.

Lead wire connection

Recommended wire:
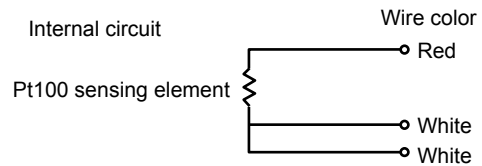1.25 mm^2 heat-resistant vinyl insulated wire (stranded)

Internal circuit — Wire color
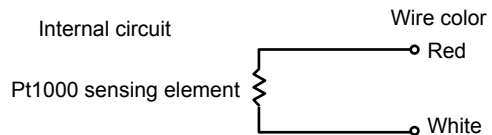Pt100 sensing element — Red, White, White

Figure 14.   Internal circuit: Model TY7301B2000

Internal circuit — Wire color
Pt1000 sensing element — Red, White

Figure 15.   Internal circuit: Model TY7301K2000

Modular connection

Internal circuit — Pin number of modular connector
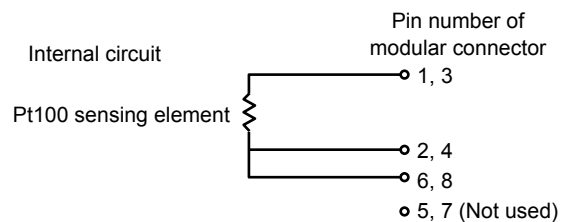Pt100 sensing element — 1, 3 / 2, 4 / 6, 8 / 5, 7 (Not used)

Figure 16.   Internal circuit: Model TY7301B2001

Maintenance

The ceiling mount temperature sensort is factory-inspected, and the temperature measuring accuracy is factory-calibrated within the specified range.　No additional field calibration therefore is necessary.
Follow the instructions below and perform maintenance.

Periodic maintenance

● Set the period between inspections based on atmospheric dust and other contaminants in the installation environment, inspect the measuring accuracy, check clogging on the cover, and clean the cover.

● Check that the cover is firmly attached to the main unit without loosening.

● Spatial temperature around human presence differs from temperature around the ceiling.　Correct the difference by setting the controller in connection if needed.

Troubleshoot

If any problem occurs during operation, refer to the table below for appropriate solutions.

Troubleshoot

Problems	Check points	Solutions
● No output ● Unstable output	Loose wiring	Re-perform wiring.
	Disconnected wiring	
	Damage on the main unit	Replace the ceiling mount temperature sensor.
Slow response to output	Moisture/condensation on Neosensor	Replace the ceiling mount temperature sensor.
	Dust in slits on the cover	Remove dust.
Error in output	Inappropriate installation location	Refer to **Installation** section and check if the installation location meets the requirements. .
	Dust and contamination on the cover	Clean the cover.
	Difference between measured temperature and actual temperature	• Correct the difference by setting the controller in connection. • Replace the ceiling mount temperature sensor. 　* Contact our sales/service persons.
Loosened cover/main unit	Loosened cover/main unit	Refer to **Installation** section, uninstall and install the cover/main unit again.

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Specifications are subject to change without notice.

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